Revised March 2001 • NREL/MP-810-24935

NREL Style Guide

Fifth Edition

Communications and Public Affairs Staff

National Renewable Energy Laboratory

1617 Cole Boulevard
Golden, Colorado 80401-3393

NREL is a U.S. Department of Energy Laboratory
Operated by Midwest Research Institute • Battelle • Bechtel

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NREL Style Guide

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About This Guide

The *NREL Style Guide, Fifth Edition,* contains the style guidelines you need to prepare technical reports, papers, and other NREL information products. It is available in both printed copies and *online* (http://thesource.nrel.gov/comm_pa/styleguide.html). Topics are listed alphabetically for easy reference.

If you're preparing a journal article: The topics in this guide apply chiefly to NREL technical reports and papers, although many can help you with other kinds of publications, too. However, most professional journals specify a style for capitalization, references, and other topics. For information about a journal's style, please contact your group's communications representative (http://thesource.nrel.gov/comm_pa/clientreps.html) or see the NREL library's Web site (http://thesource.nrel.gov/library/ejrnl/ejournal.htm).

If you need a press release or press kit: When you have questions about the preferred style for press releases and other media materials and need assistance in preparing them and obtaining the required approvals, please contact NREL's Public Affairs staff (http://thesource.nrel.gov/comm_pa/experts.html) and refer to *The Associated Press Stylebook and Libel Manual.*

If you have grammar questions: This guide contains punctuation, grammar, and usage guidelines as well as technical information. But if you can't find something here, please take a look at these online guides:

- *The Elements of Style,* by William Strunk, Jr., and E.B. White (http://www.bartelby.com/141)
- *Prof. Charles Darling's Guide to Grammar and Writing* (http://ccc.commnet.edu/grammar)
- *Grammar and Style Notes* (http://andromeda.rutgers.edu/~jlynch/Writing/contents.html)
- *OWL Online Writing Lab* (http://owl.english.purdue.edu/internet/index.html)

If you want to print something: NREL's publications coordinators in Information Services can help you with questions about printing and publishing at the Laboratory; see the IS Web site (http://thesource.nrel.gov/is/) for details.

If you have any other questions about publishing at NREL: Please ask a representative of the Communications and Public Affairs Office if you have questions about any other topics, such as electronic publications or NREL and DOE Web sites. Information about whom to contact and the procedures to follow is also online (http://thesource.nrel.gov/comm_pa/cpa_home.html).

Happy publishing!

NREL's Style

A and An

Here are some guidelines for using *a* and *an* before an acronym or word: Use *a* before any acronym or word beginning with a consonant sound. Use *an* before any acronym or word beginning with a vowel sound. An acronym or abbreviation can be pronounced as a word (for example, a HEPA filter), or as its letters (for example, an NGO). The first sound of the word or letters shows you whether to use *a* or *an*. Examples: a light-water reactor, an LWR; a Human Resources Office memo, an HRO memo; a nongovernmental organization, an NGO; a National Renewable Energy Laboratory subcontract, an NREL subcontract. See also NREL's list of commonly used acronyms (http://thesource.nrel.gov/ comm_pa/pdfs/acronym.pdf).

Abbreviations

To avoid confusion, spell out an abbreviation in full or define it the first time you use it, unless all your readers know what it means. Most readers of technical reports and papers are familiar with common technical abbreviations used in their disciplines (cm, m, Hz, kW, rpm), so you don't usually need definitions. However, spell out a technical abbreviation in full in text when you use it without numerals. For example, write "a few centimeters" rather than "a few cm." Otherwise, use the abbreviation consistently (see the NREL Online Style Guide for some common abbreviations).

In brochures, exhibits, and other products for a wide audience, please limit abbreviations. If you need to use many abbreviations and acronyms in a report, add a list of definitions, glossary, or nomenclature. Please see also Pacific Northwest National Laboratory's (http://www.pnl.gov/ag/usage/acronym.html) online guidelines for authors.

1. Abbreviating Measurement Units

Abbreviate units of measurement. With a few exceptions (such as %, °, $, and ¢), use a space to separate them from numerals:

✎ 900 W/m^2
43 cm
60 Hz

Define measurement units if they might confuse readers. Spell out the term first, and follow that with the abbreviation in parentheses; thereafter, you may use the abbreviation:

✎ 250 hectares (ha)

Spell out units of measurement when they're not accompanied by numbers:

✎ The new film was several nanometers thicker than the previous one.

2. Abbreviating Names

When you first use them, spell out the names of professional societies, organizations, processes, technical equipment, and long chemical terms, followed by the abbreviation in parentheses:

✎ American Society for Testing and Materials (ASTM)
National Fire Protection Association (NFPA)
public utility commissions (PUCs)
chemical vapor deposition (CVD)
compact vacuum insulation (CVI)
chlorofluorocarbons (CFCs)

Use a small *s* (no apostrophe) for plurals of most abbreviations (PUCs and CFCs, not PUC's or CFC's). For plurals of units of measurement, omit the *s* (e.g., 15 cm, 6 m, 5 million Btu, 75 dB, 40 W).

To abbreviate World Wide Web, use *the Web,* rather than *WWW*, after writing the name out in full the first time you mention it.

3. Abbreviating Report Elements

You can abbreviate *equation* and *reference* when you use them with numbers, but spell them out at the beginning of a sentence:

✎ See Eq. 1-1, Eq. 2-7, and Ref. 10.
Equation 2-1 shows the relation.

See also **acronyms** and **units of measurement**. In writing or editing a journal article, consult the publisher's guidelines for abbreviations, if they are available. For abbreviations of journal titles, please see http://webofscience.com/help/A_abrvjt.html.

Abstracts

An abstract usually accompanies journal articles, conference papers, and formal technical reports; it is an important indexing and research tool.

1. For Journal Articles

The abstract usually states the purpose and objectives of the study, investigation, or experiment. It summarizes the results described in the body of the paper. The abstract often places the paper and the research in the context of broader work and objectives. Consult the particular journal for guidance on abstracts, including limits on the number of words.

2. For Conference Papers

To present a paper, you might have to first submit an abstract briefly describing the paper's purpose and contents to those who are sponsoring or organizing the conference. Patent (legal) review is required for NREL conference abstracts before they're submitted; management review may also be required. Please see your communications representative for details.

3. For Technical Reports

DOE requires an abstract of 200 words or less for the last page (the document control page) of an NREL technical report. It should contain a brief description of the context, purpose, and nature of the work described in the report and a brief summary of major results or conclusions. Your communications representative can prepare the document control page for you when you submit your abstract.

Academic Titles

Omit professional and academic titles like *doctor* and *professor* and their abbreviations (Ph.D.) in NREL's technical and management reports, unless you are referring to an M.D. See also **references**.

Acknowledgments

You may acknowledge the reviews, funding, and other assistance of individuals and groups in NREL technical reports and papers. Acknowledgments can go in a preface or foreword in a technical report, or they can be on a separate page if they are extensive. They also often follow the main text in professional journal articles. Journals usually contain examples or instructions for authors.

Acronyms

An acronym is an abbreviation or initialism that is pronounced as a word:

✎ RAM OPEC
NASA NORAD

Some common acronyms are no longer capitalized:

✎ laser radar sonar

Spell out capitalized acronyms when you first use them, and put the acronym in parentheses after the full name. To avoid confusion, try not to use too many acronyms and abbreviations in any one sentence or paragraph. Include a glossary or list of acronyms if your publication contains a lot of them. See the *NREL Online Style Guide* for lists of acronyms used at NREL and other laboratories (http://thesource.nrel.gov/comm_pa/styleguide.html).

Active Voice and Passive Voice

Try to write more active-voice sentences than passive-voice sentences. In other words, the subject of most of your sentences should be the "actor" or "agent" (who did it?) rather than the thing "acted upon":

✎ Active voice: We tested the apparatus.
Passive voice: The apparatus was tested by us.

Places and things can also be subjects of active-voice sentences. Research shows that active voice helps even highly educated readers absorb information more quickly. Passive voice is no longer considered to be more scholarly or scientific than active voice. Active voice also lends clarity and vigor to technical writing. But sometimes passive voice is appropriate, especially when it's more important to emphasize what was done than who did it. Passive voice can add variety to your writing, too. See also **personal pronouns**.

Addresses and Phone Numbers

Use U.S. Postal Service abbreviations (such as CO for Colorado and DC for District of Columbia) for states in bibliographies, references, and full addresses (those that include streets or post office boxes):

✎ P.O. Box 123
Denver, CO 80101

In text, when you refer to a state with a city or by itself (for example, "The state energy office is stepping up solar retrofit activities in Massachusetts"), spell out the name of the state in full, except for the District of Columbia (D.C.). See also **states and countries.**

Use hyphens to separate the 10 digits in phone numbers:

✎ 303-555-1212

Another new style uses periods: 303.555.1212. Whichever phone number style you choose, be sure to use it consistently in your publication.

Affect and Effect

Affect is usually a verb and *effect* is usually a noun.

Affect (verb):

✎ The new deposition process *affected* the efficiency of the device.

Effect (noun):

✎ We measured the *effect* of the new process on the efficiency of the device.

These words can be confusing, because *affect* can sometimes be a noun (when it denotes an emotion), and *effect* can be a verb (when it means "to bring about").

Appendices

You can include detailed background or technical information, derivations, equations, or data tables in one or more appendices. Large, detailed tables are often placed in an appendix. If you have more than one appendix, title them with letters (Appendix A, B, C, etc.) and name figures and tables so they reflect the title (Figure A-1, Table B-2, etc.). If you have only one appendix, title it "Appendix" rather than "Appendix A."

Approvals and Reviews

See **reviews and approvals**.

Author-Date Citations

This is the preferred style for NREL reports and papers. Please do not use a comma between the author's last name and the year: (Smith 2000). See also **references**.

Bibliography

A bibliography, which is different from a reference list, is a list of works that are related to your subject or publication but not cited, either by author or by number, in text. Alphabetize works in bibliographies according to the last name of the first author; you can use NREL's reference style in listing the works if you don't have other guidelines (e.g., from a journal). Some bibliographies are titled "For Further Reading." Compile your in-text citations of literature and other sources in a list of **references** (please see).

Bullets

Bullets are usually printed as solid, centered dots to the left of items in a **list**. You need to have at least two items in a bulleted list. Set off subordinate items (also at least two) with a different symbol, such as a hyphen:

- Make bulleted lists parallel in construction (that is, begin all the items in the list with the same part of speech, such as a verb or a noun).
  - Make sure items are either all phrases or all complete sentences.
  - Punctuate all items consistently.
- Use bulleted lists sparingly, in most cases, to highlight important items, draw attention to main points, or help readers find information.

- Use numbered or lettered lists instead of bullets if you want to refer to items in a list or procedure elsewhere in the text.
- Begin each item with a capital letter; omit ending punctuation for all but the last item, unless all the items are complete sentences.

Capitalization

1. Capitalizing Proper Nouns

Capitalize proper names (see the *U.S. Government Printing Office Style Manual* for detailed guidelines). These include the names of government programs, official projects, formal groups, organizations, companies, the Internet, titles when they precede a name (except for the President of the United States, use lowercase in titles that follow the name), specific geographic areas or features, and ethnic groups:

✎ the Alcohol Fuels Program
the Ethanol Project
the Human Resources Office
the U.S. Bureau of Mines
Solarex Corporation
World Wide Web (the Web); the Internet
President Carter
Christine Johnson, president and chief executive officer
the Southwest
Lake Powell
the Colorado River
African, Asian, Caucasian, Hispanic, or Native Americans

2. *Capitalizing Taxonomic Names*

When writing about botanical and zoological divisions, capitalize the names of all divisions higher than species: genera, families, orders, classes, and phyla. Print genera, species, and varieties in italics:

✎ *Clostridium thermocellum*
Escherichia coli

After you first mention them (and spell them out), you can abbreviate most generic names followed by species names:

✎ *C. thermocellum*
E. coli

3. Capitalizing Table Titles, Headings, and Captions

Capitalize the main words of table titles and most headings and subheadings, including the second word in a hyphenated term (for example, *PV Program Five-Year Plan*). Do not capitalize articles (*a, an, the*) unless they begin the title or heading; conjunctions (*and, or, nor, but*); prepositions (*for, of, to*); or symbols, special terms, and abbreviations that are usually not capitalized:

✎ **Table 1. Number and Frequency of Defects in Six Samples**
(May June 1998)

Testing the 7.6-m Blades (subhead)

Results for *E. coli* (subhead)

Capitalize only the first word and proper nouns in figure captions:

✎ **Figure 1. Results for the electrochromic window developed at NREL**

Follow the style recommended by your professional society or journal publisher regarding the word *figure* and its abbreviation (*Fig*.) when you prepare a paper or an article for submission to a conference or journal. Many societies and publishers recommend lowercasing everything but the first word and proper nouns in all table titles, subheads, and captions. For more information, see the NREL library's journal holdings (http://thesource.nrel.gov/library/ejrnl/ejournal.htm).

4. Capitalizing States and Titles

Capitalize the names of states, but capitalize *state* only when it appears with the entire official name:

✎ the State of Colorado; Washington State

Capitalize titles when they precede the person's name. Lowercase titles and names of groups when they follow the name (except for the President of the United States):

✎ Mary Jones, the president of the company
John Smith, the chair of the committee

5. Capitalizing Trade Names

Capitalize trade or brand names, and include a trademark, copyright, or other symbol only when it's part of the official name. Include the symbol the first time you use the trade name; thereafter, you may omit the symbol.

✎ Pyrex®
Kleenex

Refer to the company's literature or stationery if you're not sure. See also this online checklist for current trademarks: http://www.inta.org/tmcklst1.htm.

Captions

Begin figure and photo captions with a capitalized word and use lowercase thereafter, except for proper nouns and capitalized abbreviations; unless you add a **subcaption**, you don't need a period at the end of a caption:

✎ **Figure 2. The NREL fractionation process**

Chemical Terms

Do not use a hyphen in most chemical expressions, even when the terms are used as modifiers:

✎ carbon dioxide levels
hydrogen ion activity

Use a hyphen after prefixes when that's the standard for certain chemical formulas:

✎ L(+)-2, 3-butanediol
trans-glycol

Use a hyphen to indicate mixtures or combinations:

✎ hexane-benzene

Citations

See **references** for guidance on author-date and numbered citations.

Colons

Colons formally introduce a list or series, a question, or an amplification. Colons often separate the parts of a ratio:

✎ We test three types of collectors: flat plates, evacuated tubes, and parabolic troughs.
We added enough water to obtain a 3:1 dilution.

But commas, not colons, usually follow words such as *that is*, *namely*, or *such as*. You don't need a colon after a verb or preposition that precedes or introduces a list (*includes*, *to*, *with*, *between*, etc.). Use a colon when a noun (such as *the following*) introduces a list in text.

Color Printing

DOE regulations govern all printing at NREL. To print NREL reports and other publications in more than one color of ink, approval is needed from the DOE Public Affairs officer in the Golden Field Office. Please see the NREL publications coordinator or your communications representative for details.

Commas

Rules for using commas have changed many times over the years, and they're still changing. The rules often depend on the kind of publication you are preparing. For example, the rules in style guides for technical writers often differ from those for newspaper and magazine article writers. Here are some guidelines for NREL technical publications:

1. When To Use Commas

Use a comma to separate items in a series, including the next-to-last word in the series:

✎ We develop solar thermal, wind, biomass, and photovoltaic energy technologies.

Use a comma to separate the parts of a compound sentence linked by a coordinating conjunction (such as *and*, *but*, *or*, or *nor*) when each part has its own subject and verb (unless they're very short):

✎ I laughed at the unintentional joke, but she frowned.

Use commas to set off nonessential or nonrestrictive (parenthetical) words, phrases, and clauses from the rest of the sentence; in other words, the commas signal that the information between them is something extra and not essential to the meaning of the sentence:

✎ The subsystem, *which takes a day to install,* will be delivered in two weeks.

Use commas to enclose the name of a state (when it follows a city) and a year (when it follows the month and day):

✎ The test systems in Gardner, Massachusetts, are performing well.
The next test sites will be in Golden, Colorado, and Chapel Hill, North Carolina.
On April 11, 1998, the committee members completed five of the six objectives.

Place commas (and periods) inside quotation marks; place semicolons, question marks, dashes, and exclamation points outside quotation marks unless they're part of the quotation:

✎ I couldn't find a definition for "prioritized," so it might not be correct; let's use "assigned priorities to."

Did you remember to look up the word "accommodate"?

2. When Not To Use Commas

Do not use a comma to separate compound subjects or compound verbs:

✎ *Theorists and nonspecialists* alike agree on the importance of the discovery. (There is no comma between the two parts of this compound subject.)
The researchers *rolled out* the thin metal sheet *and formed* it into coils. (There is no comma between the two parts of this compound verb.)

Do not use commas to set off words or phrases that are restrictive, that is, essential to the meaning of a sentence:

✎ Only the sensors *that were attached to the outer edge* failed. (The words are essential to the meaning of the sentence.)
The system will work efficiently *only if it includes storage.* (The words are essential to the meaning.)

See also **which and that**.

Compose and Comprise

"Composed of" is correct; "comprised of" is incorrect. Here's a way to remember the distinction between these words:

✎ The parts compose the whole;
the whole comprises its parts.

Example:

✎ The department comprises four groups; each group is composed of five to seven scientists, technicians, and support staff.

Compound Words, Unit Modifiers, and Hyphens

1. Verb Phrases: Verb, Noun, and Adjective Forms

Verb phrases that contain an adverb (build *up,* set *up,* start *up*, break *down)* are usually written as two words. The noun and adjective forms of these words are either one word (no hyphen) or a hyphenated form of the words, as the dictionary indicates (We observed the slow *buildup* of

biofouling on the blades; he gave us the *setup* schedule; the *start-up* costs were higher than we estimated; I think I'm having another *breakdown*).

2. Compound Words Containing Prefixes and Suffixes

You don't need a hyphen between many prefixes and suffixes and the root words, unless the root word is a proper noun:

✎	multidimensional	prescreening
	multiyear	postdoctoral
	reevaluated	retroactive
	subsection	nonspecialist
	midwestern	subassembly
	threefold, hundredfold	lengthwise
	(also 100-fold)	windward

These prefixes usually require a hyphen: *ex-*, *self-*, *quasi-*.

3. Unit Modifiers with and without Hyphens

Use a hyphen to indicate that words have been combined into a unit modifier, which is a descriptive expression composed of two or more words that form *one* new meaning. For example, in the term *flat-plate collector, flat-plate* is the unit modifier. Although there is a tendency in modern writing to eliminate hyphens, they help prevent ambiguity and confusion. Here are some examples of unit modifiers that usually include hyphens:

✎ low-level radiation
last-minute addition
on-site experiments
band-gap energies
fatigue-induced wear
five-year plan
nine-story building

To see how adding the hyphen can prevent confusion, consider these examples:

✎ The scientists tested a new defect causing gas.
The scientists tested a new defect-causing gas.

In the first example, the scientists might seem to have been testing a defect; in the second example, it's clear that they have tested a gas.

You don't need a hyphen in common unit modifiers that are not ambiguous or confusing:

✎ *high school* students
solar radiation resource
solar thermal electric systems

Don't use a hyphen when both words of a unit modifier are capitalized:

✎ Bronze Age tools
Vietnam Era veterans
Biofuels Program objectives

Leave out the hyphens if you rewrite a sentence so the words in the unit modifier come after the noun they describe:

✎ We purchased state-of-the-art lab equipment.
We purchased lab equipment that reflects the *state of the art.*

The report describes our on-site experiments.
The report describes the experiments we conducted *on site.*

They made some last-minute adjustments.
They made some adjustments at the *last minute*.

Don't use a hyphen with a unit modifier containing an adverb ending in -*ly*:

✎ heavily skewed results
frequently missed deadlines

When you use numbers in unit modifiers, retain all the necessary hyphens:

✎ 2-in.-diameter tubes
13-cm-wide substrate

or rewrite the sentence to omit the hyphens: tubes that are 2 in. in diameter; a substrate that is 13 cm wide.

Use a hyphen between prefixes and proper nouns (but not common nouns) or dates, whether they're used as nouns or modifiers:

✎ non-NREL mid-1990s

Use two hyphens when adding a prefix to a word that already contains a prefix, even when there is no hyphen after the prefix in the original word:

✎ non-self-limiting multiple-band-gap

Some computer-related expressions that were once hyphenated as unit modifiers (such as *data-base* and *on-line*) are becoming commonly accepted as single words (*database*, *online*). Some new expressions still retain the hyphen (*e-mail*, *e-commerce*). See also the *GPO Style Manual* for good examples of compound words and unit modifiers.

Conference Papers

Conference papers prepared by NREL employees are considered to be NREL publications, even if they are published elsewhere, such as in a proceedings of a conference sponsored by a professional society. They are subject to the same review and approval procedures (see the Communications and Public Affairs Web site, http://thesource.nrel.gov/comm_pa) as other NREL publications.

Conference Presentations

If you need assistance with slides, overheads, online presentations, or any other aspect of a conference presentation, contact your communications representative. NREL staff can also help you make your presentations as dynamic and effective as possible. See the Communications and Public Affairs Web site (http://thesource.nrel.gov/comm_pa) for more information.

Contents

In NREL reports, the table of contents usually follows the rest of the front matter. Front matter can include the title page; a preface or foreword; acknowledgments (these can also be in a preface); a glossary, acronym list, or nomenclature; and a summary. Sometimes the glossary follows the text. Lists of figures and tables follow the contents page(s). Each main section of the report is listed in the table of contents with the page it begins on; some authors also like to list subsections. Nothing that comes before the table of contents (front matter) is listed, but references, bibliography, and appendices (back matter) are listed. Publications for general audiences probably should include a contents list if the publication is more than about 10 to 15 pages long.

Copyright Laws

Because NREL publications are produced with government funds, most of them can be reproduced when credit is given. Non-government printed materials, graphic illustrations, software, certain electronic products (such as videos and CD-ROMs) and even unpublished documents are usually protected by copyright. Reproducing or using them without the permission of the copyright owner is illegal. When we include or reproduce the copyrighted materials of others in our publications, we need to obtain permission from a publisher or author and include a copyright notice:

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The Fair Use Doctrine in copyright law states that a certain amount of copyrighted material may be reproduced "for purposes such as criticism, comment, news reporting, teaching, . . . scholarship, or research." Even so, it is best to obtain permission from the copyright holder before publishing any document containing more than a few paragraphs of another's work or more than a few scholarly references to one work; this also pertains to graphic illustrations and photos. Even if you don't need permission to publish (for example, if the work is in the public domain), be sure to state the source of all quotations, processes, illustrations, and other elements that are not those of an NREL author.

We use a one-page form (http://thesource.nrel.gov/tech_info/publish/ publishing.html#copyright) to request permission to use copyrighted material on the World Wide Web.

As an NREL employee, you may be asked to sign a copyright transfer form to have your article published in a journal. NREL has a special copyright status that grants a journal publisher a limited copyright. Check with the Legal Office if you have questions about copyrights.

Criterion, Datum, Memorandum, Phenomenon, and Their Plurals

Criterion is a singular noun (one criterion) and *criteria* is the plural (two or more criteria). *Data* is the plural of *datum*. The plural of *memorandum* can be either *memoranda* or *memorandums*. *Phenomenon* is singular, and *phenomena* is plural.

Dashes

Use dashes (often called *long dashes* or *em dashes*) to enclose and set off parenthetical (nonessential but often illustrative) information in a sentence:

✎ The polymer components of the cell walls—cellulose, hemicellulose, and lignin—provide the feedstocks for these chemicals.

Use a dash to signal that an important point is going to be made or that a change in the construction of the sentence follows:

✎ The presentation concluded with a discussion of the two project factors that concern contractors the most—cost and time.

The major omission in the project assessment was the delay caused by the circuit failures—everyone knew about it but no one mentioned it to the reviewers.

You can usually use commas, colons, and semicolons in place of dashes. But dashes add special emphasis.

Use shorter dashes known as *en dashes* (rather than a hyphen or em dash) to indicate a range or to substitute for the word *to*:

✎ 25–45 cm^2
2–5 runs per hour
See Sections 3.1–3.6.

Do not use an en dash (or hyphen) to mean *and;* the word *between* is followed by the word *and* (not *to*): *between* 25 *and* 30.

Data in Tables

Place a zero to the left of the decimal in any number less than 1 in text and tables (0.5; 0.039). Align columns of data vertically on the decimals. When the units of measurement for the data are different, alignment is not necessary (but be sure to specify the units).

Degree Symbol

Print the degree symbol right next to the symbol for the temperature scale:

✎ 36°C
85°F

Repeat the degree symbol in ranges:

✎ 32°–36°C

Express kelvins as K rather than as °K; leave a space before the K:

✎ 85 K

Disclaimer

DOE requires that a disclaimer be printed in NREL technical reports and papers. The disclaimer you use depends on the kind of report or paper being published. See your communications representative for details.

Distribution

The distribution of publications produced at NREL is governed by certain NREL and DOE regulations and procedures. Please see your communications representative or the NREL publications coordinator for more information.

Dollars

Express thousands of dollars this way, using a comma:

✎ $5,000

Express millions and billions of dollars this way:

✎ $3 million; $1.2 billion

In technical reports and papers, use a dollar sign to express costs under $1.00:

✎ $0.25; $0.06 per kilowatt-hour

Editorial Review

Editorial review is required for NREL reports and papers. Editors review publications for compliance with DOE and NREL regulations and guidelines, edit for clarity, and check for correct grammar and punctuation. To save time and money, we encourage you to (1) edit your draft at least once before contacting an editor, and (2) participate in these reviews in collaboration with the editor. Please see your communications representative and the Communications and Public Affairs Web site (http://thesource.nrel.gov/comm_pa) for more information about editing and the **levels of edit** used at NREL.

Electronic Document Citations

See **references.** For more information, see also an online guide prepared for NASA (http://larcpubs.larc.nasa.gov/guidelines/elements/elements.html#7), and guides compiled by Longman Publishing (http://www.awl.com/englishpages/).

Ellipses

When you want to leave out part of text material you are quoting, use ellipsis marks (three dots separated by spaces) to indicate the omission:

✎ A *participle* is "a word having the characteristics of both verb and adjective . . . [that] shows such verbal features as tense and voice . . . ."

Retain the period at the end of the sentence, even after adding the three ellipsis dots. In most cases, however, you don't have to use ellipses at the beginning or end of quotes, just within them. When you add a word or words to the quote, to make it clear, enclose the added word or words in brackets to show that it is not part of the original quotation.

When you quote whole paragraphs but omit text between any two of them, center three asterisks, with spaces between them (* * *), between the paragraphs quoted. See also **quotations**.

Equations

Make sure that all the terms in your equations are defined and used consistently both in the text and in subsequent equations, figures, and tables:

✎ The conductive heat flow equation is

$$dQ/dt = AKdT/dx ,$$

where

dQ/dt	=	the time rate of heat transfer
A	=	the area of an end contact
K	=	the thermal conductivity
dT/dx	=	the thermal gradient.

Etc.

Because it's vague, please use "etc." (et cetera) sparingly. Don't add it to the end of a list beginning with the words "for example," or the abbreviation "e.g.," because each word in your list *is* an example of your subject or topic, but "etc." is not, so you don't need it.

Exhibits

Exhibits produced at NREL must be reviewed and approved by Public Affairs staff, according to policies established by NREL and DOE. Please contact your communications representative for more information and assistance. Experienced staff are also available to help you plan attractive exhibits and have them prepared. Please see the Communications and Public Affairs Web site (http://thesource.nrel.gov/comm_pa) for more information.

Figures

Figures can include line drawings, graphs, charts, diagrams, schematics, flow charts, illustrations, and photographs. Use a similar sans serif font (such as Helvetica, Univers, or Arial) and line weight in your figures so they look consistent. Be sure that computer-generated figures are clear and readable so they can be reproduced easily.

Use a bold sans serif font such as Arial or Helvetica for captions; capitalize only the first word and proper nouns. You can number figures in a simple sequence in a brief report or paper (Figure 1, Figure 2). In longer reports, papers, or book chapters, you can include section or chapter numbers in the figure numbers (Figure 1-1, Figure 1-2, Figure 2-1, and so on).

Make sure the data in your figures correspond to the data in your text and tables. See the following illustration for an example of a figure, prepared by a graphics specialist, that could be used in an NREL report, paper, or presentation. The caption is placed under the illustration (see also **captions***)*.

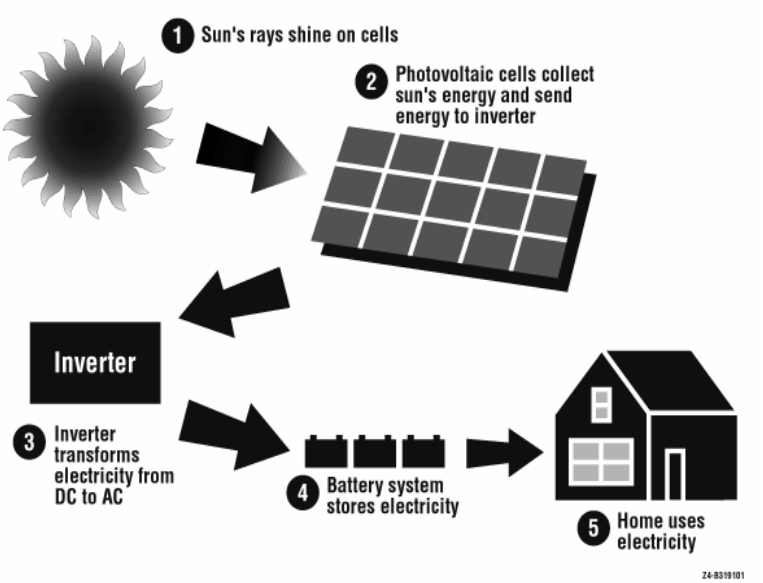

Figure 2-1. Photovoltaic cells use sunlight to provide electricity to homes

First-Person Pronouns

Numerous scientific and technical associations (such as the American Institute of Physics) ask technical writers to use first-person pronouns whenever it is appropriate. First-person pronouns include *I*, *we, my*, *our, me,* and *us*; second-person pronouns are *you* and *your;* and third-person pronouns include *he, she, him*, *her, his, hers, they, their*, and *them*. See also **personal pronouns**.

Fiscal Year

Spell out *fiscal year* (no capitals) the first time you use it, unless your readers know what the abbreviation means; after that, you can abbreviate it using two capitals followed by a space before the full year (FY 2001 is preferred, not FY01).

Fonts

Use Times Roman or a similar font with serifs for the text of NREL technical papers and reports. Use a sans-serif font such as Arial or Helvetica for **figures**, **tables**, and **headings** (see).

Footnotes

You can use footnotes to place detailed explanatory or supplementary information at the bottom of a page; please use in-text **references** to cite others' works. If you use footnotes in an NREL report, mark them using this hierarchy (if several appear on one page): asterisk, double asterisk, dagger, double dagger (*, **, †, ‡). However, many journals prefer using superscript numbers or letters. You can also place explanations, details, contradictions, and examples in the text rather than in footnotes. Footnote symbols and numbers are printed outside commas and periods but inside colons, semicolons, and dashes:

✎ The experiment took place in April,* and it was evaluated in May.**

We discussed these three stages of writing*: prewriting, writing, and revising.

Mark the footnotes to tables in NREL reports with superscript letters: [a], [b], [c], etc.

Foreword

The foreword to a book, monograph, or formal report contains introductory remarks written, and usually signed, by someone other than the author or authors. Brief introductory remarks written by authors are contained in a **preface**.

Fractions

Use words instead of numerals for simple fractions in text:

✎ a third of the way
one-fifth its actual size
three-fourths of the participants

Write out complex fractions with numerals separated by a solidus:

✎ 1/64
23/32
5-1/2 days afterward
2-1/2 times greater

Display complex, built-up fractions by centering them vertically between two parts of a paragraph:

$$1n\left(\frac{N_e}{n}\times\frac{\eta}{1-\eta}\right)$$

Place a zero to the left of the decimal in fractions less than 1:

✎ 0.125
0.006

See also **equations**.

Front Matter and Back Matter

NREL reports can include a **title page**, **disclaimer**, **foreword**, **preface**, **acknowledgments**, **nomenclature, summary**, **table of contents**, and **lists of figures and tables** (front matter) and a **glossary**, **reference** list, **bibliography**, and **appendices** (back matter). Paginate front matter

with small Roman numerals (i, ii, iii) rather than Arabic numbers. Count the title page as page i, but don't print the number on it. All technical reports should contain a title page, a disclaimer, and a table of contents. Many outreach publications, such as DOE/NREL program overviews, contain only a contents list and brief acknowledgments in the front matter.

Geographic Regions

Capitalize regions of the United States when they appear by themselves:

✎ the East, the West, the North, and the South
the Southeast, the Northeast, the Southwest, the Pacific Northwest
the Midwest, the East Coast, the West Coast, the Gulf Coast

Don't capitalize words that merely describe general areas in the country or areas of a state:

✎ the eastern United States
southwestern Nebraska
northern New Mexico
the midwestern states

Glossary and Nomenclature

If you use many mathematical or Greek symbols, technical terms, abbreviations, or acronyms in your report or paper, consider defining them in a glossary or nomenclature. Arrange the list alphabetically, and group Greek letters and definitions alphabetically in a separate list. Nomenclatures are usually in the front of a report, right before the contents page. Glossaries usually go in the back, before the references.

Government Printing Office (GPO)

NREL's outside printing activities are regulated by the Joint Committee on Printing and by the U.S. Government Printing Office (GPO). See the publications coordinator or your communications representative (http://thesource.nrel.gov/comm_pa/clientreps.html) for more information about GPO printing regulations and contracts.

Headings and Subheadings

The section or chapter headings of a report are usually printed in a large (15-point) Helvetica Bold or a similar font (such as Arial or Univers); subheadings are 11 or 12 points in size. Here is a standard format for four levels of report subheadings:

✎ **First-Level Subheadings: Arial Bold**
Second-Level Subheadings: Arial Bold Italic
Third-Level Subheadings: Arial Italic

Fourth-Level Subheadings: Times Roman Bold or Italic. (Begin text on the same line after this subheading, which is followed by a period.)

You can number headings and subheadings (1.0, 1.1, 1.2, 2.0, etc.) if you think that will help readers with a long report. Print text in 11- or 12-point Times Roman or a similar **font**. This style guide is printed in typical NREL report fonts.

Hyphens

See **compound words, unit modifiers, and hyphens.**

Internet Document Citations

See **electronic document citations** and **references**.

Introduction

Introductions usually contain background information on the research being reported and the general nature and context of the work and its results (the "big picture"). Earlier related work can also be described.

Italics

Italics are available in most printers and most word-processing and desktop publishing software. If you can't print an italic font, however, you can substitute underlining.

1. Using Italics for Emphasis

Use italics (sparingly) to emphasize a word or phrase or bring attention to it:

✎ *Never* operate this equipment when it has a yellow *danger* tag.

2. Using Italics for Foreign Words and Phrases

Italicize such foreign words and phrases as *in situ*, *in vivo*, and *inter alia*; however, if the word or phrase is commonly used in your field, you may omit the italics.

3. Using Italics for Hyphenated Prefixes

Italicize hyphenated prefixes (such as *cis-, trans-, o-, m-,* and *p-)* to chemical formulas:

✎ *trans*-1, 2-dibenzoylethylene
trans-glycol

4. Using Italics to Cite Published Documents

Use italics in **references**, **footnotes**, and **bibliographies** for book and report titles and the names of journals, newspapers, and magazines:

✎ *Gone with the Wind*
FY 2001 Annual Report
Applied Physics Letters
The Denver Post
Science

But print the titles of journal and magazine articles in regular Roman type and in quotation marks:

✎ "Solar Chimney Theory: Basic Precepts"

5. Using Italics in Taxonomic Names

Unless you're discussing a genus in a general way, use italics to refer to specific genera, species, and varieties:

✎ *Clostridium thermocellum*
C. thermocellum

6. Using Italics in Referring to Words as Words

Italicize a word or phrase when you're referring to it as a word or as a phrase:

✎ The word *footnote* is often used in place of *reference*.
He wrote *ambiguous*, but I think he meant *ambivalent*.

It's and Its

Even though "it's" has an apostrophe, it isn't a possessive pronoun. "It's" is a contraction, a short form of two words, like "isn't." "It's" always means "it is." "Its" is the possessive form of "it." Like "his," "hers," and "ours," the possessive "its" never needs an apostrophe.

✎ **It's** a shame that the company lost **its** biggest investor.

Journal Articles

Articles submitted to peer-reviewed journals do not need two internal peer reviews, but other NREL reviews, such as management, legal, and editorial review are required (see http://thesource.nrel.gov/comm_pa/publish/review.html). Use the journal's style for captions, headings, text, acknowledgments, footnotes, and references. Most journals supply instructions

for authors (see http://thesource.nrel.gov/library/ ejrnl/ejournal.htm); please contact the library for assistance.

Legal Review

See **patents and patent review**.

Levels of Edit

Please see your communications representative or the Communications and Public Affairs Web site (http://thesource.nrel.gov/comm_pa/publish/write.html) for information about the three levels of editing at NREL: light, moderate, and heavy (sometimes called a "rewrite").

Library Services and Requirements

Contact the NREL library (http://thesource.nrel.gov/library/) for help with literature searches, citations, reference materials, database searches, online catalogues, interlibrary loans, and many other services. The library needs to receive at least three copies of each paper, report, or other publication prepared at NREL (except for conference announcements and "one-time-only" handouts not likely to be reprinted). Library copies are needed for reference, archival, and record-keeping purposes; they are included automatically in distributions handled by communications staff. If you are listed as co-author of a paper or report published outside NREL (for example, a report published by another government agency, such as EPA), please send three copies of the paper or report to the NREL library.

Lists

You can use bulleted or numbered lists in NREL publications; here's an example of a numbered list:

✎

1. Include at least two items in a bulleted or numbered list.
2. Use numbered lists for procedural steps and for items referred to elsewhere in text (for example, "as described in step 2").
3. Use parallel construction in lists; that is, make all the listed items similar; use sentences or phrases throughout, and begin each item with a verb or a noun.
    a. Use lowercase letters to mark subordinate items in your list.
    b. Make sure you have at least two subordinate items under each main item.
    c. Indent them like this.
4. Use punctuation in lists when the items are complete sentences; otherwise, place a period after the last item only.

You can also list a few items or procedures in paragraph format and number them (1) one, (2) two, (3) three, and so on. See also **bullets.**

Management Review

Management review is required for NREL publications. See **reviews and approvals** for more information.

Mathematical Symbols

Leave a space on either side of mathematical symbols used as operation signs:

✎ $T_{in} - T_{amb}$
$°C \times 1.8$

The solidus (a/b) or division sign is an exception. Do not leave a space between numerals and the symbols for degrees, dollars, and percents (32°, $100, 17%). (Leave a space between numerals and most measurement units, like cm and Å, however.) Do not leave a space between symbols like >, <, ≥ and the numeral unless they are the operation signs in an equation.

Measurement Units

See **units of measurement**.

Metric Conversions

For quick online conversions of English units of measurement to metric units, see http://www.webcom.com/legacysy/convert2/convert2.html or http://www.french-property.com/ref/convert.htm.

Metric System

See **SI (Metric) System**.

Misplaced Modifiers

Modifiers in the wrong place can make a sentence puzzling:

✎ After identifying the correct material, the test procedure took us about five minutes.

In this example, it isn't clear who or what identified the correct material. This might be better: After identifying the material, we conducted the five-minute test procedure.

✎ After being lost under a pile of old reports for five years, she finally found the manuscript.

What, or who, was lost — the manuscript, the woman, or the reader?

Try to keep modifiers as close as possible to the people and things they describe. Strunk and White, authors of *The Elements of Style,* say this: "Modifiers should come, if possible, next to the word they modify." This is especially true for sentences containing introductory prepositional phrases or clauses followed by a comma.

Months and Years

In reports, papers, and other formal documents, it's preferable to spell out the names of months in text. But you can abbreviate them in references and in less formal documents, such as memos. However, *May*, *June*, and *July* are usually spelled out in full. Abbreviate other months to the first three letters, except for *Sept*. Whether you spell them out or abbreviate them, please be consistent. Omit commas when the month and year appear together (*October 2001*). When you include the day, use either *October 1, 2001*, or *1 Oct. 2001* (but be consistent).

Multiplication Symbols

Be as consistent as possible in using multiplication symbols in your paper or report; as appropriate, choose one symbol (× or •) or omit the symbol, as appropriate, and use proximity or parentheses: ab, (ab) (cd), etc.

Nonrestrictive Phrases and Clauses

A nonrestrictive phrase or clause is one that adds information but is not essential to the meaning of the sentence:

✎ The principal investigator, who has studied thin films for 10 years, will chair the panel discussion.
The passive solar features, which were suggested by NREL staff, reduced the agency's energy bills by 30%.

Nonrestrictive or nonessential phrases and clauses are enclosed between two commas when the phrase or clause is within a sentence, and they usually begin with the pronoun *which* rather than *that*. See also **restrictive phrases and clauses** and **which and that.**

Non-SI (English) Units of Measurement

Use non-SI or nonmetric units of measurement (English or Imperial units) instead of metric units only when they are the industry standard. Otherwise, state metric units first, followed by English equivalents in parentheses:

✎ 38.1 m (125 ft)

Nouns

Technical writing can get bogged down when long sentences become overcrowded with passive voice and certain long nouns (e.g., determination, completion, accomplishment, achievement, measurement, conversion, characterization, combination). To give your writing more flow and vigor, try changing some of the nouns (especially those ending in *-tion* and *-ment)* to verbs (e.g., determine, complete, accomplish, achieve, measure, convert, characterize, combine) and other parts of speech. Doing this will move your readers along more quickly and make it easier for them to understand your text. In these examples, we changed some of the nouns in the first sentences to verbs and other parts of speech:

✎ *Contraction* of the tree stems occurred with *rapidity.*
The tree stems *contracted rapidly.*

The frequent *result* of this process is the *combination* of the molecules.
This process frequently *causes* the molecules *to combine.*

The *application* of fertilizer has the *result* of *stimulation* of the yield.
Applying fertilizer *stimulates* the yield.

Which sentences were easiest to read and understand? When you change some nouns to verbs and delete unnecessary words, your writing can be more clear and vigorous.

Noun Strings

Try not to string too many noun modifiers together in a sentence. An "agency personnel communications interface display" could also be called a "display of the communications of the agency's personnel." Better yet, it could just be called the "staff bulletin board."

Numbers

NREL's conventions for numbers include general rules; rules for alignment; the use of fractions and decimals; precision conventions; and guidelines for punctuation, ranges, scientific notation, and spelling.

1. General Rules for Numbers

Use numerals with units of measurement and time:

✎

2-1/2 hours	87 years
4.5 months	6 liters
36 cm	25 kW

With units of time, you can spell out numbers less than 10 if you do so consistently (this applies mainly to outreach publications and products rather than to technical reports and papers):

✎ five-year plan
two-hour test
three-week turnaround

Use numerals to imply arithmetical values or manipulation:

✎ a factor of 3
multiplied by 2
a ratio of 4:5
values of 1 and 48

Express measurement errors as follows:

✎ 6 nm ± 0.2 nm

Leave a space between the number and the unit of measurement (0.2 nm) and put spaces around the operation sign; when the measurement error appears by itself, omit the space between the sign and the number:

✎ The measurement error is ±0.2 nm.

2. Aligning Numbers

Align numbers that share a common unit of measurement on the decimals in columns of tables; put a zero before the decimal in numbers smaller than one:

✎ 0.8
2.45
187.362

If all the numbers in a column do not share the same unit of measurement, you may center the numbers in the column and specify the unit of measurement.

3. Fractions and Decimals

You can spell out and hyphenate simple fractions (this is preferred in text) or express them, like more complex fractions, in numerals with a solidus:

✎ one-fifth or 1/5
1/64 (but not 1/64th)

Use a hyphen to separate the integral and fractional parts of a mixed number, or convert the fraction to a decimal:

✎ 2-1/2 cm in diameter
2.5-cm-diameter solar cell

For numbers of 1 million or more, use the numeral (and a decimal, if necessary) and the words million, billion, and so on:

✎ 1.1 million households
3.5 billion people
$2.5 million in funding

4. Precision and Numbers

Measurement uncertainty analysis calls for precision in measurements to a significant digit to the right of a decimal point, such as two or three digits (hundredths or thousandths). If you're not absolutely sure, check with an expert before changing the number of digits to the right of the decimal, or rounding the numbers. See also **standard errors**.

5. Punctuating Numbers

Use a comma to separate groups of three digits in numbers:

✎ 5,182
113,728
2,225,000

If the numbers do not exceed four digits in text or in a table, you may omit the comma:

✎ 3000 solar retrofits per year

Keep the comma for money:

✎ $5,000 in start-up costs

6. Ranges of Numbers

To show ranges, use an en dash (which is a little shorter than an em or long dash), a hyphen, or the word *to* when you use *of* or *from* before the range. To express a range between some number and another number, always use the word *and* (not *to*) with the word *between*:

✎ 15%–25%
from 32º to 40ºC
6–12 cm
from 66 to 80 V

10–20 m^2
between 8 and 12 m (not "between 8 to 12 m" or "between 8-12 m")

The symbols º and % are repeated in a range.

7. Scientific Notation (see also)

Express multiples of SI (metric) units in powers of 10 with the appropriate prefixes and **technical abbreviations**:

✎ mm (millimeters, 10^{-3} m)
MJ (megajoules, 10^6 J)

Use standard scientific notation to express very small and very large numbers:

✎ 2.5×10^{-3}
3.56×10^6

Avoid using M to mean *thousands* and MM to mean *millions*; use a capital M for "mega," or millions, as in *MW* for *megawatts*.

8. Spelling Out Numbers

Except with units of measurement and time (in technical reports), spell out numbers less than 10:

✎ eight experimental runs
three species of yeast

Spell out all numbers at the beginning of sentences:

✎ Fifteen trials later, the results were the same.
Thirty-five participants attended the seminar.

When a sentence contains one or more numbers greater than nine that are related to a smaller number, use numerals for all of them:

✎ The results were the same in 3, 12, and 18 trials.
The contractor tested 8 devices in May, 12 in June, and 9 in July.

Spell out the first of two adjacent numbers unless the first one requires three or more words:

✎ ten 5-kW arrays
thirty-two 4-cm^2 devices
135 16-cm collectors

See also **fractions**.

Over and Under

In most cases involving quantity, it is preferable to use "more than" rather than "over" and "fewer than" or "less than" rather than "under":

✎ More than 500 people attended the conference, about 100 fewer than last year.

Pagination

Paginate the **front matter** of NREL reports with lowercase Roman numerals, up through the lists of figures and tables. The title page is usually page i, although that number isn't printed on the page. Paginate the main body of your report with Arabic numerals. You may insert a blank page before page 1 to make sure it will be a right-hand (odd-numbered) page, but don't insert blank pages after that. All subsequent sections can begin on the left or on the right, as they fall. If you include **appendices** at the end, you may continue to paginate them sequentially with numerals or use A-1, A-2, A-3, B-1, B-2, and so on, for the page numbers.

Parallelism

Use parallel construction in sentences as well as in **lists**. Express all similar sentence elements (subjects, verbs, verbals, objects) in a similar way:

✎ **Not Parallel Structure:**
The lever was moved completely forward, going slightly to the right, and then it went backward halfway in order to complete the procedure.
We are not only responsible to our chief customer but also the taxpayers.

✎ **Parallel Structure**:
To complete the procedure, push the lever all the way forward, slide it slightly to the right, and then pull it halfway back.
We are responsible not only to our chief customer but also to the taxpayers.

Parentheses

Use parentheses as appropriate for explanatory material in text, and as shown in the examples that follow.

1. Parentheses in Equations

Use parentheses, brackets, and braces in this sequence (which may be repeated as needed):

✎ {[( )]}

2. Parentheses with Measurements

Use parentheses around English measurements that follow SI (metric) measurements.

✎ 3.1 m/s (7 mph)

3. Parentheses in Citations

When you use parentheses in text, such as for author-date references or for parenthetical (added) information, place a comma after the parentheses rather than before them:

✎ In earlier research (Jones 1989), we showed how quantities of lipids could be increased by this method.

Patents and Patent Review

DOE and its contracting operators and staff retain certain patent rights to technical and scientific equipment, software, and other products developed at NREL. Therefore, legal review and clearance must be obtained for all publications so they do not jeopardize or forfeit patent rights. However, NREL subcontractors that are small businesses, university groups, or nonprofit organizations usually retain patent rights to their work. Contact the Legal Office for more information about proprietary and patentable material and intellectual property.

Peer Review

At least two peer reviews are required for NREL publications. See **reviews and approvals**.

%; Percent; Percentage

Use the symbol % with numerals; use the word *percent* when you spell out numbers at the beginning of a sentence. To determine whether *percent* or % is singular or plural, look at the noun associated with it. If the noun is a plural, use a plural verb; if it's singular, use a singular verb:

✎ The maximum glucose *yield* was 60%.
Six percent of the *pipes* were rusty.
Approximately 10% of that *amount* was allocated to planning.

When there is no number, use the word *percentage*, unless people in your field use a different terminology, such as *percent difference*:

✎ This table shows the percentages of government buildings having solar roofs, by state.

Periods

Periods are used in some **abbreviations** (e.g., i.e., a.m., p.m.) and not in others (ac, dc, rpm). Most **acronyms** do not have periods. When you end a sentence with *etc*. (although this is seldom necessary) or another abbreviation that already includes a period, do not add another one:

✎ This paper describes the program's purpose, objectives, schedule of deliverables, etc. (Better: This paper describes the program's purpose, objectives, and schedule of deliverables.)

Personal Pronouns

Many people have been taught not to use personal pronouns (*I, we, they*) in technical and scientific writing, because this kind of writing is supposed to be formal and objective. However, most modern technical style guides (such as the *AIP Style Manual*) recommend using personal pronouns as appropriate in papers and reports. Personal pronouns prevent confusion by clearly and concisely showing who performed an experiment or procedure:

✎ We tested several hundred isolates that were able to ferment glucose.
We deposited a thin film of doped cadmium on the substrate.

Which of these two sentences is easier to read and understand quickly?

✎ 1. It was determined that the workshop was a success.
2. Participants determined that the workshop was a success.

See also **active voice and passive voice**.

Photographs

See **PIX** (online: http://www.nrel.gov/data/pix/pix.html). When you use an image from PIX, be sure to credit the photographer or other source as a courtesy or for legal purposes.

PIX

PIX (http://www.nrel.gov/data/pix/pix.html) is NREL's searchable, online photo collection. It contains thousands of photo images depicting NREL and DOE activities that support the research and development of renewable energy and energy efficiency technologies. PIX numbers are included in NREL and DOE publications, usually with photo credits.

Preface

Brief introductory remarks and acknowledgments go in the report's preface. The preface comes after the title page and disclaimer page. (See **front matter**.) A preface written by someone other than the authors of the report is usually called a "**foreword**."

Prefixes

See **compound words, unit modifiers, and hyphens** and **scientific notation**.

Presentations

For templates of NREL PowerPoint presentations, please see NREL's internal Web site (http://thesource.nrel.gov/presdb/help_create.htm).

Pressure

Use the standard SI unit for pressure or stress, which is the pascal (Pa) or the bar. Non-SI units include psi (pounds per square inch), millimeters of mercury, torr, and atmospheres, and they are still in widespread use.

Principal and Principle

"Principal" often means "chief" or "main," such as the principal investigator in a research project or the principal of a high school. "Principle" often refers to a belief, value, or rule, including one you live by.

Printing

For publications intended for distribution outside NREL, printing and photocopying are subject to DOE and other government regulations. Please contact NREL's publications coordinator for more information.

Publication (or Report) Numbers

Numbers are required on most publications distributed outside NREL, and they are included in NREL's publications database. Exceptions include conference announcements and informal handouts at seminars and meetings. Conference papers and journal articles by NREL authors, even if they are published by professional societies or associations, still need an NREL publication number. DOE documents and other communication products prepared at NREL need DOE numbers; see your communications representative or the publications coordinator for assistance with these numbers.

Quotation Marks

Use quotation marks for direct quotes, titles of articles and papers, and words referred to as words (e.g., in definitions). Place quotation marks outside **periods** and **commas** but inside **colons** and **semicolons:**

✎ "Let's meet again in 6 months," the chairman said, "to discuss our progress."
She presented a paper titled, "Materials Research in Silvered Polymer Reflectors."
He asked me to define "serendipity"; I handed him the dictionary.

Use single quotation marks to indicate a quotation within material that is already enclosed in double quotation marks:

✎ "Explain what you mean by 'confidence,' " she said.

When quotations are longer than two or three lines of text, begin them on the next line and indent them on each side (block quotations). You do not need quotation marks around block quotations, and you can use standard double quotation marks for quotes within block quotations. In in-text quotations, place reference numbers, superscripts, and author-date citations outside quotation marks (but before the final punctuation of a sentence). Place them after the final punctuation of the last sentence in a block quotation.

Ratios

In general, use a colon to indicate a ratio:

✎ We prepared a 3:1 dilution.

Some industries (such as the American automotive industry) use a solidus to express a ratio:

✎ The engine is designed to have an optimum air/fuel ratio.

References

Professional societies usually specify a style for references in papers published in their journals and proceedings. But if you're preparing a paper or report for NREL or for a publisher that has no prescribed style, you can use one of two basic formats for citations in text and the reference list at the end of your document: numbered references or author-date references (NREL's preferred style). A reference list contains only the sources you cite in your paper or report. Include works not cited and sources of additional information in a **bibliography**.

1. Numbered References

Use a numbered reference list, not one sorted alphabetically, if you use footnote or reference numbers [1] in the text of your report or paper. Here are some examples:

✎ *Technical paper:*
1. Hulstrom, R.L. "Solar Radiation Topical Overview." *Photovoltaics and Insolation Measurements Workshop Proceedings; June 30–July 3, 1985, Vail, Colorado*. SERI/CP-215-2773. Golden, CO: Solar Energy Research Institute, 1985; pp. 1–11.

Journal article:
2. Czanderna, A.W. "Solid Surfaces, Surface Processes, and Solid/Gas Interactions." *J. Vac. Sci.* Technol.; Vol. 17, 1980; p. 72.

Book:
3. Perry, R.H; Chilton, C.H. *Chemical Engineer's Handbook*. 5th edition. New York: McGraw Hill, 1973; pp. 6–14.

Chapter in a book:
4. DeBlasio, R.; Stone, J.; Surek, T.; Emery, K.; Myers, D.; Kroposki, B.; Mrig, L.; Burdick, J.; Czanderna, A.; Strand, T.; Osterwald, C. "Photovoltaic Performance and Reliability," Chapter 5. Boer, K.W., ed. *Advances in Solar Energy: An Annual Review of Research and Development*. Vol. 10, Boulder, CO: American Solar Energy Society, Inc., 1995; pp. 247–345.

Editor and book in a series:
5. Cooper, E.L., ed. *Invertebrate Immunology*. Contemporary Topics in Immunology, Vol. 4, New York: Plenum Publishing, 1974.

Report:
6. Bergeron, P.W.; Riley, C.J. *Wastepaper as a Feedstock for Ethanol Production*. NREL/TP-232-4237. Golden, CO: National Renewable Energy Laboratory, November 1991.

Subcontract report:
7. Whitney, K.A. *Determination of Alternative Fuels Combustion Products: Phase 3 Report*. NREL/SR-540-13594. Work performed by Southwest Research Institute, San Antonio, TX. Golden, CO: National Renewable Energy Laboratory, December 1997.

Patent:
8. Baumann, B.D., et al., U.S. Patent No. 4,771,110, 13 September 1988.

Private communication:
9. Smith, J.Q. Internal memorandum. U.S. Department of Commerce, Washington, DC, 29 February 1988.

Thesis or dissertation:
10. Gossett, J.M. *The Treatment of Refuse for Increasing Anaerobic Biodegradability*. Ph.D. Thesis. Stanford, CA: Stanford University, 1976.

Electronic document:
11. Ivey, K.C. "Untangling the Web: Citing Internet Sources." *The Editorial Eye* online, http://www.eeicom.com/eye/utw/96aug.html. Last modified Mar. 24, 1997; accessed July 3, 1997.

Newsletter article, no author given:
12. "Uses of Petroleum." *Connections: Energy, Environment, Economics and Education Working Together*. Institute of Science and Public Affairs, Florida State University. Vol. 6, No. 3, April 1998; p. 4.

2. Author-Date References

If you used author-date citations in text [for example, (Potter and Benson 1991)], arrange your reference list alphabetically according to the first author's last name. (Note that there is no comma between the names and the publication date in in-text citations.) In your reference list, use the reference style adapted from one used in NREL's Publications Database unless your instructions (e.g., from an outside publisher) state otherwise. Examples:

✎ *Technical paper:*
Potter, T.F.; Benson, D.K. (January 1991). "Non-CFC Vacuum Alternatives for the Energy-Efficient Insulation of Household Refrigerators: Design and Use." Prepared for the 42nd International Technical Conference, May 1991. NREL/TP-253-4124. Golden, CO: National Renewable Energy Laboratory, 13 pp.

Journal articles:
Zangrando, F.; Bharathan, D.; Link, H.; Panchal, C.B. (October–December 1990). "Seawater Test Results of Open-Cycle Ocean Thermal Energy Conversion (OC-OTEC) Components." *Heat Transfer Engineering* (11:4); pp. 44–53.

Osorio, R.; Froyen, S.; Zunger, A. (April 1991). "Superlattice Energetics and Alloy Thermodynamics of GaAs/Ge." *Sol. State Communications* (78:4); pp. 249–255.

Books:
Merk, J.S.; Fogg, I.J.; Snowe, C.Q. (1983a). *The Meteorologist's Handbook*. Chicago, IL: Alwether and Clere.

Book published in same year by same author(s):
_____. (1983b). *Trends in Global Temperatures*. Chicago, IL: Alwether and Clere.

Chapter in a book:
DeBlasio, R.; Stone, J.; Surek, T.; Emery, K.; Myers, D.; Kroposki, B.; Mrig, L.; Burdick, J.; Czanderna, A.; Strand, T.; Osterwald, C. (1995). "Photovoltaic Performance and Reliability," Chapter 5. Boer, K.W., ed. *Advances in Solar Energy: An Annual Review of*

Research and Development, Vol. 10, Boulder, CO: American Solar Energy Society, Inc.; pp. 247–345.

Editor and book in a series:
Cooper, E.L., ed. (1974). *Invertebrate Immunology*. Contemporary Topics in Immunology, Vol. 4, New York: Plenum Publishing.

Report:
Whalen, M.; Kelly, K. (1997). *Perspectives on AFVs: 1996 Federal Fleet Manager Survey*. NREL/TP-540-22720. Golden, CO: National Renewable Energy Laboratory.

Subcontract report:
Sidhu, S.; Graham, J.; Taylor, P.; Dellinger, B. (May 1998). *The Origin of Organic Pollutants from the Combustion of Alternative Fuels: Phase V/VI Report*. NREL/SR-540-24134. Work performed by the University of Dayton Research Institute, Dayton, OH. Golden, CO: National Renewable Energy Laboratory.

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Baumann, B.D., et al., U.S. Patent No. 4,771,110 (13 September 1988).

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Newsletter article, no author given:
"Uses of Petroleum." (April 1998). *Connections: Energy, Environment, Economics and Education Working Together*. Published by the Institute of Science and Public Affairs, Florida State University. Vol. 6, No. 3; p. 4.

See also the *Chicago Manual of Style*. Make your references consistent, and include enough information for the reader to locate your source easily. For books and reports, include the authors' names, the title, the city and state of publication, the publisher, and the month (if known) and year of publication. For articles and papers in periodicals, include the authors' names; the article title (optional in some reference styles); the name of the periodical; the volume, number, and year of publication; and the page numbers of the article or paper. Include the URL or World Wide Web address for electronic documents along with the date you accessed the site. See also

electronic document citations. For help with many journal title abbreviations, please see http://www.webofscience.com/help/A_abrvjt.html.

Report Contents

See **acknowledgments**, **bibliography**, **contents**, **fonts**, **figures**, **tables**, **foreword**, **front matter and back matter**, **glossary**, **headings**, **pagination**, **preface**, **report covers**, **references**, **summary,** and **title page**.

Report Covers

NREL uses standard covers for most **technical reports and papers** and **subcontractor reports.** Covers contain the laboratory's name, address, and logo as well as an NREL **report number** and date of publication. Your communications representative can obtain standard covers for you.

Restrictive Phrases and Clauses

Do not use commas around restrictive phrases and clauses. They are essential to the meaning of the sentence, in contrast to nonrestrictive phrases and clauses, which simply add information that is not essential. The following examples show the distinction between essential and nonessential information:

> Restrictive clause (begins with *that*) containing essential information:
> This is the house *that Jack built*.
>
> Nonrestrictive clause (begins with *which*) containing additional information:
> This house, *which Jack built*, needs repairs.

See also **which and that.**

Reviews and Approvals

Four kinds of reviews are required for most publications (including journal articles) and information products distributed outside NREL: **peer, patent, management**, and **editorial**. Please see your communications representative, your manager, and NREL's policies and procedures for more information, as well as "The Publications Review Process" on the Intranet (http://thesource.nrel.gov/comm_pa/publish/review.html).

Scientific Notation

Standard scientific notation represents a number as a factor multiplied by a power of 10; 3,560,000 is expressed as 3.56×10^6. This is useful for very large and very small numbers, especially in non-SI units. You can also use certain standard prefixes, many of which are listed here with their abbreviations:

10^{24}	yotta	Y
10^{21}	zetta	Z
10^{18}	exa	E
10^{15}	peta	P
10^{12}	tera	T
10^{9}	giga	G
10^{6}	mega	M
10^{3}	kilo	k
10^{2}	hecto	h
10^{1}	deka	da
10^{-1}	deci	d
10^{-2}	centi	c
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n
10^{-12}	pico	p
10^{-15}	femto	f
10^{-18}	atto	a
10^{-21}	zepto	z
10^{-24}	yocto	y

We recommend choosing a prefix that permits the numerical value to fall between 0.1 and 1000 (e.g., 62 kW rather than 62,000 W).

Semicolons

Semicolons indicate a stronger or more important break in the flow of words than the break indicated by a comma. Use a semicolon in compound sentences that are NOT linked by a conjunction (such as *and, but, or, nor, yet*). Place a semicolon before conjunctive adverbs (such as *however, hence, therefore, nevertheless, consequently*) in most complex sentences containing two or more clauses. When a sentence contains items in a series, you may use a semicolon between the items if one or more of the items contains commas.

1. Using Semicolons in Compound Sentences without Conjunctions

When clauses in a sentence are closely related in meaning, a semicolon is an appropriate dividing punctuation mark. Note that the words *and, but, or,* and *nor* do not follow semicolons:

✎ It was difficult to reproduce the experiment; the material Smith and Jones used was not widely available.

Of the 13 samples, only one did not degrade; others deteriorated an average of 8%.

2. Using Semicolons with Conjunctive Adverbs

Yet and *so* are usually preceded by commas in a complex sentence. But use a semicolon before such conjunctive adverbs as *then, however, thus, therefore, hence, accordingly, moreover, nevertheless, consequently, besides, indeed,* and *subsequently;* place a comma after the adverb:

✎ The contractor's representative was out, so I left a message.

We used the Schartz-Metterklume method in the experiment; however, the problems with this method are well known.

Energy requirements are often expressed in quads, or quadrillion Btu; therefore, this report describes the number of quads supplied annually by each option.

Use a semicolon before *i.e.* ("that is") and *e.g.* ("for example") and a comma after them when a clause (with a subject and verb) follows them; use a comma when a phrase or list follows.

3. Using Semicolons in a Series

When items in a series contain internal punctuation, such as commas, or are very long, you can separate the items with semicolons. Examples:

✎ The contaminants in the sample were TCE, 150 ppb; toluene, 220 ppb; and benzene, 265 ppb.

Promising new technologies demonstrated at the exposition included advanced wind turbines; polycrystalline, thick-film, and thin-film solar cells; fast-growing energy crops; and fuel cells.

The vendor assured us that the replacement parts, which were essential in this installation, were on order; that the parts would be delivered as soon as they arrived; and that the delay in shipment was unavoidable.

SI (Metric) System

NREL follows national policies and those of scientific societies by using the SI (Systeme International d'Unites; International System of Units), or metric system, in expressing technical measurements. English units may follow metric ones or may be used alone in special cases, when this is appropriate for a publication's audience. See also Pacific Northwest National Laboratory's online guide, *Metrics the Right Way* (http://www.pnl.gov/ag/usage/metrics.html), and http://physics.nist.gov/cuu/Units from the National Institute of Standards and Technology (NIST).

Solidus (Slash)

The solidus (or slash, slant, shilling mark, or virgule) is a versatile symbol that has mathematical as well as textual functions.

1. Using a Solidus in Fractions

Use a solidus to express a quotient in text when you do not need to use a displayed equation:

✎ These structures yield photoluminescence lifetimes that are related to bulk lifetime by the expression $1/\tau = 1/\tau_B + 2\ S/D$.

Use a solidus in superscript and subscript fractions:

✎ $x^{1/2}$.

2. Using a Solidus in Text

In text, use a solidus to indicate junctions, interfaces, and components:

✎ gas/liquid interface, 1-butyl acetate/acetic acid/water (3:1:1)

With abbreviated units of measurement, the solidus stands for "per":

✎ 2 g/cm^2
355 W/m^2

But spell out "per" when you spell out the units of measurement:

✎ several cubic meters per second; a few cents per kilowatt-hour

Sources

Include the sources of all figures and tables that were originally published by others, especially those outside NREL. If figures or tables come from a copyrighted publication, you may need permission to reproduce (see also **copyright laws).** Add the source at the end of a figure caption or in a note following a table:

✎ Source: Hansen, W.L.; Pearton, S.J.; Haller, E.E. (1984). *Appl Phys. Lett.* 44:606.

Write out the source in full, as in the example, if it is not in your reference list or bibliography. If it is in the reference list, use one of these styles:

✎ Source: Hansen, Pearton, and Haller 1984.
Source: Ref. 19. (for numbered references)

Standard Errors

Express standard measurement errors this way:

✎ 6.0 nm ± 0.2 nm

States and Countries

1. States

In text, consistently spell out states' names (in formal publications) or use conventional state abbreviations (in less formal documents) rather than using U.S. Postal Service (USPS) abbreviations:

✎ California or Calif. (rather than CA)
Colorado or Colo. (rather than CO)
Wyoming or Wyo. (rather than WY)

You may use D.C. for the District of Columbia in text, in both formal and informal publications. When you include addresses or state names in full addresses (containing streets and cities), contact lists, reference lists, and bibliographies, however, you may use the following USPS abbreviations:

✎ AL, AK, AZ, AR, CA, CO, CT, DC, DE, FL, GA, HI, ID, IL, IN, IA, KS, KY, LA, ME, MD, MA, MI, MN, MS, MO, MT, NE, NV, NH, NJ, NM, NY, NC, ND, OH, OK, OR, PA, RI, SC, SD, TN, TX, UT, VT, VA, WA, WV, WI, WY, (PR, VI)

2. Countries

Do not abbreviate the names of countries (including the United States) when they are used as nouns, except in the case of *USA*. Use *U.S.* as the adjective form.

Subcaptions

Print captions to figures and photos in bold. Subcaptions are supplementary information that follows a period after the main caption. Subcaptions are not printed in bold.

✎ **Figure 2-1. Photoconductivity spectra of a composite CIS thin film.**
Inset: the probable energy band diagram.

But follow the publisher's guidelines for journal articles and conference papers. In documents for DOE, both captions and subcaptions are often printed in **italics** (see).

Subcontract Reports

Technical reports prepared by NREL's subcontractors are subject to some review and approval procedures and exempt from others. For example, universities, nonprofit groups, and small businesses usually retain patent rights to their subcontracted work, so NREL patent review might not be needed. Check with your communications representative if you need to publish a subcontractor's report.

Summary

If you include a summary in your technical report, place it before the contents page. If your report is brief, a summary isn't usually necessary. If your report is long, or if you think some readers will want one, you can include a summary or executive summary. Executive summaries of very long reports can also be published separately.

Tables

In small or average-sized tables, place a horizontal line (as wide as the table) under the title, a narrower one under column headings, and a wide one between the table and sources or notes, if any. Delete vertical lines and extra horizontal lines, unless the table is very large; in that case, inserting horizontal lines every three or four rows can help readers locate data. Example:

Table 1. Photovoltaic Power Production in Three Applications (megawatts)

Application	1986	1987	1988	1989	1990
Central Station PV	3.8	4.7	5.5	5.9	6.4
Consumer Products	0.5	0.6	0.8	2.5	2.2
Grid-Connected PV	0.5	0.2	0.6	0.4	0.4

Number tables in simple sequence or by section in long reports (Table 1, Table 2, or Table 1-1, Table 1-2, and so on). Center the table title over the table (unlike a figure caption, which goes under the figure) and print the title in a bold font such as **Arial Bold**; supplementary material in the title is not in bold. If possible, print tables in Helvetica, Arial, Univers, or another sans serif font rather than Times Roman or another serif font. Define abbreviations, if they are not obvious, in notes to the table. Table notes are usually denoted by lowercase superscript letters (**a**, **b, c**) rather than footnote numbers or asterisks.

Table of Contents

A table of contents is required in most technical reports. See **contents**.

Technical Reports and Papers

NREL technical reports and papers need four kinds of reviews: editorial, management, patent, and peer. Please see your communications representative (information is on the internal NREL Web site) or the NREL publications coordinator for more information.

Taxonomic Names

See **capitalization** and **italics.**

Temperature

Use a degree symbol (°) with temperatures expressed in the Celsius and Fahrenheit scales but not with kelvins (just use K). Don't leave a space between the number and the letter for °C and °F, but leave a space between the number and K.

That and Which

See **which and that**, **nonrestrictive phrases and clauses**, and **restrictive phrases and clauses**.

Time

Use lowercase a.m. and p.m. to denote ante meridiem and post meridiem (before and after noon); use a lowercase *s* (no apostrophe) to show the plural of a decade expressed with numerals (the 1990s).

Title Page

Most NREL technical reports contain a standard title page inside the cover. Your communications representative (see NREL's Communications and Public Affairs Web site) can prepare these for you.

Unit Modifiers

See **compound words**, **unit modifiers**, and **hyphens**.

Units of Measurement

Use numerals with units of measurement and time in technical reports and papers, even when the number is less than 10. In some outreach publications, you can spell out numbers less than 10, however, especially for units of time. Except with $, ° and %, leave a space between the numeral and the unit:

✎	2 kW	7 cm^2	45°	5 years
	3 m	6 months	16.8%	3 million
	8-hour days	$0.35/kWh	$2 billion	300 Btu

Unless your profession, technical field, or scientific discipline specifies something different, use the abbreviations in NREL's list of technical **abbreviations,** Pacific Northwest National Laboratory's guide, *Metrics the Right Way* (http://www.pnl.gov/ag/usage/metrics.html), or the National Institute for Science and Technology's guide (http://physics.nist.gov/cuu/Units).

Web Sites

NREL's Web specialists and communications staff can help you create and maintain Web sites, post your documents, and perform many other Internet-related activities. See NREL's Web site for more information, including quality-control standards and recommended practices for NREL-developed sites (http://nreldev.nrel.gov/standards). Sites developed for NREL's Intranet follow these standards: http://thesource/standards/. If you're developing a site that will reside on the Energy Efficiency and Renewable Energy Network (EREN) please see the standards and practices at http://erendev.nrel.gov/standards.

Which and That

Standard American English uses *which* for nonrestrictive or nondefining phrases and clauses and *that* for restrictive or defining phrases and clauses.The word *which* usually signals the approach of added, nonessential information. When a phrase or clause is not essential to the meaning of a sentence, use the relative pronoun *which* and enclose the phrase or clause in commas:

✎ This paper, which she has been working on for three weeks, discusses string theory.

When a phrase or clause is essential to the meaning of a sentence (that is, the sentence would not make much sense without it), use the relative pronoun *that* and leave out the commas:

✎ The paper that he completed recently will be presented in New York; the paper that he finished last summer will be presented in Philadelphia.

See Strunk and White's *The Elements of Style* for more on *that* and *which.*

Word Processing Services

NREL's word processing specialists in Information Services can help you prepare NREL reports and papers. Contact them or your communications representative for details.

Zero

For numbers less than one, place a zero before the decimal:

✎ 0.5 0.125

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